EXHIBIT 32

EXECUTIVE SUMMARY

I. Expertise of Steven Penrod

I am a Distinguished Professor of Psychology at the John Jay College of Criminal Justice of the City University of New York. I hold a J.D. degree from the Harvard Law School, and a Ph.D. degree in social psychology, also from Harvard University. I have testified as an expert on a variety of social science and law issues (mostly eyewitness issues) in nearly 150 cases in federal and state venues, including Wisconsin, Minnesota, Illinois, Ohio, Indiana, California, Texas, Oklahoma, New York, New Jersey, Maine, Connecticut, Massachusetts, New Hampshire, Maryland, the District of Columbia, Virginia, Delaware, and Pennsylvania. I am an author or co-author of nearly 50 eyewitness publications including 30 original research articles published in peer reviewed scientific journals.

I have been asked by counsel to examine portions of the Nolan case file in order to identify factors that could have contributed to a misidentification by the witnesses in this case and about which I would be (prepared to testify at the trial of defendant. In my report I note the following:

II. The Problem of Eyewitness Identification Errors (p. 10)

Legal scholars have studied the causes of mistaken identification in over 1,000 criminal cases and conclude that the single leading cause of mistaken conviction is erroneous eyewitness identifications. In the first-200 DNA exculpation cases the leading cause of the wrongful convictions was erroneous eyewitness identification--which occurred in 79 percent of the cases and more than a third of the misidentification cases had two or more witnesses who made misidentifications (13% had three or more misidentifications). The prominence of mistaken IDs in DNA cases continues to this day. http://www.innocenceproject.org/causes-wrongful-conviction

III. The Growing Body of Scientific Research on Eyewitness Reliability (p. 12)

The research on eyewitness reliability is of relatively recent vintage. The volume of research has generally more than doubled each decade since the 1960s.

IV. The Need for Expert Testimony (p. 12)

Cross-examination is sometimes hailed as a powerful engine for determining truth, but is this true in eyewitness cases? Effective cross-examination requires that juries are sensitive to the factors that influence eyewitness identification accuracy. Desmarais & Read (2010) review studies of lay knowledge about factors influencing eyewitness performance and report it is common to find that 50-65% of respondents chose answers similar to those of experts. While this performance may look relatively good it generally indicates there are significant disagreements among jurors and, to some extent, the seeming agreement with experts likely arises from "good" guessing by laypersons. There is, in addition, evidence that cross-examination may impair juror assessments of eyewitness evidence by reducing the accuracy of eyewitness testimony (Valentine & Maras, 2011).

Most relevant to the question of juror sensitivity are studies which attempt to simulate the jury's actual task of evaluating eyewitness identifications. Studies of mock-jurors' abilities to differentiate between accurate and inaccurate eyewitnesses converge on a dismal conclusion about jurors' abilities. Jurors overestimate the accuracy of identifications (there are more convictions than there are accurate identifications), jurors fail to distinguish accurate from inaccurate eyewitnesses, jurors tend to ignore viewing conditions that are known to predict identification accuracy and instead based their decisions in part on eyewitness memory for peripheral details and witness confidence--both of which tend to be poor predictors of identification accuracy. Across cases in which a number of forms of evidence have been systematically manipulated (e.g. disguise, weapon

focus, level of violence, retention interval, instruction bias, foil bias, and witness confidence) Only confidence influenced verdicts despite the fact that studies reveal that eyewitness confidence and identification accuracy are only modestly related.

V. Eyewitness Expert Testimony Helps Jurors (p.17)

Studies including Cutler, Dexter & Penrod, (1989 and Cutler, Penrod & Dexter, (1989) have shown that expert testimony can increase juror sensitivity to variations in trial evidence such as those noted above. Without such testimony, jurors reveal poor knowledge about eyewitness problems.

VI. Research Findings and Expert Testimony Meet Admissibility Criteria (p. 21)

The eyewitness research community (which includes several researchers, such as myself, who have dual training in law and psychology) has been sensitive to the question of the admissibility of testimony about eyewitness research findings. Does this research meet the scientific standards required by the courts? One can address this question from multiple perspectives. Under the traditional *Frye* standard the relevant question would be whether the testimony is generally accepted within the relevant scientific community Under the Federal Rules of Evidence and *Daubert* considerations such as whether: (a) the expert is qualified; (b) the testimony assists the trier of fact; (c) the expert's testimony is sufficiently reliable, (d) the materials about which the expert testifies are the product of the scientific method (including falsifiable theories, peer-review).

Virtually all of the empirical eyewitness research conducted by psychologists makes use of standard experimental methods employed in all the experimental sciences. A hallmark of this research is the falsifiability/testability of research hypotheses that are tested using experimental research methods in which the variables or processes examined by researchers are carefully controlled by the researchers in order to assess their causal effects on outcome variables (such as identification accuracy). Use of appropriate research methods is an essential requirement for publication in peer-reviewed scientific journals across all scientific disciplines and psychology is no exception. The results and conclusions summarized below are the products of precisely the methods underscored by the Supreme Court in *Daubert*.

There is a consensus on the content of expert testimony. Kassin, Tubb, Hosch, & Memon (2001) extended prior research with experts and found levels of agreement among 64 eyewitness experts. Recently Daftary-Kapur (2010, 2013) and I surveyed 71 leading eyewitness researcher (on average the experts had published 18.51 scientific journal articles, 2.9 books, 8.3 book chapters, 3.7 law review articles, 5.3 magazine articles, and 3.0 newsletter articles. Experts had testified in over 1600 cases. We found even higher levels of agreement among experts.

VII. Subject Matters for Expert Testimony in the Present Case (p. 24)

Face Recognition is Far from Perfect Even Under Optimal Testing Conditions. Megreya & Burton (2008) conducted a study in which participants were shown a live person for 30 seconds and were then tested, from memory, on a 10-person photoarray—when the target was in the array he was identified by 70% of the participants and a non-target person was identified by 10% of participants. When the target was not in the array, 20.5% misidentified someone else. When participants were shown the live person and the photoarray together (a matching task rather than a memory test), the target was identified by 66.9% of the participants and a non-target person was identified by 15% of participants. When the target was not in the array, 37.8% misidentified someone else.

Field Experiments Testing Witness Memory Show High Rates of Witness Identification Errors. One relevant source of data pertaining to accuracy rates of actual eyewitness identifications emerges from realistic field studies of eyewitness identification. Across several studies reviewed below, the average correct

identification-rate from presentations which included the target person was 41.8%. Thus, nearly 60% of witnesses failed to identify the target when he was present. Unfortunately, the false identification rate of innocent foils was nearly as high as the rate of guilty-target identifications--35.8%. In short, identification errors were rampant (Valentine, 2008).

Studies of Real Witness Performance Using Police Archives Show High Rates of Identification Errors. Similarly low accuracy rates from actual eyewitness identifications emerge from studies of actual witnesses. In these studies it is not known whether the suspect is the actual perpetrator, but it is still possible to gauge the rate of inaccurate identifications of foils—the known-innocents placed in arrays along with the suspects. The best data come from studies in the United Kingdom—the results from nearly 17,000 actual eyewitnesses shown that nearly *40% of positive identifications were identifications of an innocent foil*—which underscores that many witnesses are willing to guess and they make errors at a high rate. See, e.g., Valentine, 2008.

The "Pleading Effect" Elevates the Portion of Trial Defendants Who Have Been Misidentified. Research indicates people charged with crimes plead guilty in a high percentage of cases—(Liptak [2011] reports the rate was 97% in federal courts in 2010 and 94% in state courts in 2006). In contrast Garrett (2008) reports that just 4% of the defendants in the 200 DNA-exonerated cases he studied entered a guilty plea. The University of Michigan Exoneration Registry--with over 1700 cases as of late 2015--indicates 13% of their defendants pled guilty http://www.law.umich.edu/special/exoneration/Pages/Recent-Findings.aspx. An archival analysis (Kellstrand, 2006) of cases with both DNA and eyewitness identification evidence in the San Diego County District Attorney's Office, reported that the individuals suspected of crimes were innocent in only 5% of cases. A little algebra demonstrates that an overall 95% plea rate combined with a 5% eyewitness error rate and a13% plea rate by innocent defendants results in eyewitness trials in which in a majority of defendants are innocent!

VIII. Witnessing and Crime Factors that Influence the Accuracy of Identifications (p. 32)

Weapon Focus. Weapon focus refers to the attention witnesses give to a perpetrator's weapon during a crime. It is expected that the attention the witness focuses on a weapon will reduce their ability to later recognize the perpetrator. Researchers have assessed eyewitness accuracy in an attempt to assess the effects of weapon-focus effects on memory; the relevant studies were reviewed in a meta-analysis by Steblay (1992). The meta-analysis included 19 studies with a total sample of 2,082 participants. The weapon-focus effect on identifications was statistically significant. A recent dissertation study by one of our students at John Jay College (an active duty Connecticut police chief) DeCarlo (2010) illustrates the effect. DeCarlo used a videotaped robbery and found that in a no weapon condition, witnesses were able to correctly identify the target 78% of the time. When a weapon was implied by the perpetrator waving his hands around in his pocket, accuracy dropped to 55% and when a weapon was actually shown, accuracy dropped to 33%. When the perpetrator was absent from the lineup the correct rejection was 89% for the no weapon condition, but when a weapon was implied, accuracy dropped to 76% and when a weapon was actually shown, correct rejections dropped to 65%. A new meta-analysis (Fawcett, et al., 2013) confirms these conclusions using data from 47 comparisons and further notes that the size of the effects was "unaffected by whether the event occurred in a laboratory, simulation, or real-world environment."

Tracking the Identity of Multiple Perpetrators. Just as a weapon can divide the attention of a witness, multiple perpetrators can divide their attention and identification accuracy and accuracy of descriptions have been shown to decline as the number of perpetrators increases (Clifford and Hollin, 1981; Fahsing, Ask, and Granhag, 2004; Megreya, et al 2006; Shepherd, 1983). This impairment effect was clearly illustrated in the dissertation research by our John Jay student DeCarlo (2010) who showed his witnesses a videotaped robbery involving one or two perpetrators. When the perpetrator was present in the lineup, the single perpetrator condition produced a correct identification rate of 55% versus 33% in the multiple perpetrator condition. In the multiple perpetrator condition, 82% of witnesses correctly rejected perpetrator-absent arrays versus 92% in the single perpetrator condition.

Assessing the Probative Value of Identifications and Non-Identifications. As early as 1980 Wells and Lindsey questioned the criminal justice system's policy of treating eyewitness identifications of suspects as highly probative while treating non-identifications (both in the form of no-choices and foil choices) as non-probative. Wells and Lindsey used a Bayesian model of information to demonstrate that if an identification of a suspect increases the probability the suspect is the perpetrator, then a nonidentification or identification of someone else must reduce that probability. Wells and Olson (2002) carried the Bayesian analysis further by examining the information gain (changes in the probability the suspect is the perpetrator) as a function of the prior probability the suspect is guilty (based on evidence prior to the identification results). Filler identifications, non-identifications and "don't know" responses all have probative value with respect to the suspect's innocence and sometimes filler identifications and non-identifications have more probative value (with respect to innocence) than positive identifications of the suspect have with respect to guilt.

Stress. Deffenbacher, other colleagues, and I (2004) published a meta-analysis of stress effect studies. The meta-analysis was conducted on 27 tests of the effects of heightened stress on identification accuracy. This sample included work published between 1974 and 1997, with a total of 1727 participants involved in relevant tests of the stress-- the mean proportions correct for TP lineups under high and low stress conditions were .39 and .59, respectively (with false alarm rates of 34% and 19% respectively). The effect of stress was larger for target-present than for target-absent lineups—that is, stress particularly reduced correct identification rates. The effect was twice as large for eyewitness-identification studies that simulated eyewitness conditions (e.g., staged crimes) than for studies that induced stress in other ways.

These effects are confirmed and extended in a study by Morgan et al. (2004) who examined the eyewitness capabilities of more than 500 active-duty military personnel enrolled in a survival-school program participants experienced both a high stress interrogation with real physical confrontation and a low-stress interrogation without physical confrontation. Both interrogations were 40 minutes long; they were conducted by different persons. A day after release from the camp the participants were tested on their ability to recognize the interrogators—recognition accuracy for the low-stress interrogators was as high as 76% but as low as 27% for high-stress interrogators.

A recent confirmation of these findings comes from a study by Valentine & Mesout (2008) conducted in the "Horror Labyrinth" of the London Dungeon tourist attraction. Tourists encountered a "scary person" while slowly walking around the labyrinth for approximately 7 minutes. About 45 minutes later, after they completed their tour they were tested to see if they could identify the scary person from a nine-person photo-array. Participants who were divided into two groups reflecting the 50% with the highest reported anxiety produced by the event and the 50% with the lowest scores--75% of the witnesses experiencing lower anxiety were able to identify the scary person/culprit but only 18% of those with higher anxiety.

Cross-Race Identification. Research on cross-race identification impairment began forty years ago and has included various mixes of Caucasian, Asian, Hispanic, Black, and middle-eastern witnesses. Meissner & Brigham (2001) have reviewed research on the problems of what have sometimes been called other-race or cross-race identifications or own-race bias (ORB). Meissner and Brigham analyzed data from 39 research articles, with 91 independent samples involving nearly 5,000 witness participants. Measures of correct identifications and false alarm rates, and aggregate measures of discrimination accuracy and response criterion were examined. Overall, they reported that when the perpetrator is present the ratio of correct to incorrect identifications was 40% higher for same-race identifications. The ratio of mistaken identifications to correct rejections in target-absent arrays was 56% greater for other-race identifications. Overall, the ratio of correct to incorrect identifications was more than 2.2 greater for own-race faces as compared with performance on other-race faces.

Obscured Views of Faces/Disguise. Regarding obscured views of faces, there is research (Mansour, et al., 2012) on the effects of stockings pulled over the head (and the effects of a variety of other disguises). In the stocking-view as compared to no-stocking views, correct identifications dropped from 80% to 55% and false identifications rose from 21% to 36%.

Full face masks stockings, hats and hoods can be quite effective in diminishing the facial feature cues that are necessary for recognition. In my research (Cutler, Penrod, & Martens, 1987a, 1987b; Cutler et al., 1986; O'Rourke et al., 1989) we examined the effects of masking a target's hair and hairline cues on subsequent identification accuracy. In these experiments participants viewed a videotaped liquor store robbery and later attempted an identification from a videotaped lineup. In half of the robberies the robber wore a knit pullover cap that covered his hair and hairline. In the other half the robber did not wear a hat. The robber was less accurately identified when he was disguised. For example, in one of the experiments (Cutler et al., 1987a) 45% of the participants gave correct judgments on the lineup test if the robber wore no hat during the robbery, but only 27% gave a correct judgment if the robber wore the hat during the robbery.

More extreme disguises can produce even more substantial impairment. This is illustrated in a study by Fisher and Cox (1995) where celebrities, known to the research participants, were identified by only 12% of participants when shown only the celebrities' eyes (mouths alone produced recognition by 3% of participants). Of course it is important to emphasize that these participants were endeavoring to identify persons known to them through multiple exposures over extended periods of time—not the faces of strangers seen briefly.

Retention Interval. Common sense tells us that memory declines over time. Can we expect eyewitness identification accuracy to decline as the time between the crime and the identification test increases? My student Peter Shapiro and I included retention interval in our 1986 meta-analysis. When studies that manipulated retention interval were grouped into long versus short time delays, longer delays led to 10% fewer correct identifications and 8% more false identifications. Classic research by Egan, Pittner, and Goldstein (1977) found that the percentage of mock witnesses making false identifications increased significantly over time: 48% at 2 days, 62% at 21 days, and 93% at 56 days. The percentage of subjects making no errors declined from 45% (2 days) to 29% (21 days) to 7% (56 days).

My colleagues Bornstein, Deffenbacher, McGorty and I (2012) demonstrate that loss of eyewitness memory is most rapid early on…in the first minutes and hours. The forgetting curves/loss of memory which emerges from these studies shows that memory has typically declined by 15%-20% within 2 hours, with a further 4-5% drop in the next 10 hours. From that point forward the loss is less dramatic…though it continues—as is evident in the individual studies cited above.

IX. Aspects of Identification Procedures that Affect Identification Accuracy (p. 49)

Multiple Suspect Arrays. It is noteworthy that the first instruction in the NIJ Guide to Identification procedures is an admonition to have only one suspect per array. Multi-person, single-suspect arrays are intended to protect innocent suspects from over-eager and poor-memory witnesses. If a witness makes a "guess" in a one-suspect six-person array where the suspect is innocent, there is only a one in six chance they will pick the suspect. If everyone in the array is a suspect an innocent person will be selected every time a choice is made. The protections afforded to innocent suspects are dramatically diluted in an all-suspect array—it is akin to showing six showups all at once. The foulness of this practice is underscored by the research cited below which shows that nearly 40% of witnesses who make identifications from single-suspect arrays are indisputably mis-identifying innocent people – fortunately those innocent people are known to be innocent because they were selected to serve as innocent foils. What do we imagine those 40% who pick innocent fillers are going to do if presented with all-suspect arrays?

Prior Exposure Effects.

We know from a variety of studies that prior viewings of an innocent person can render them vulnerable to a significantly enhanced risk of misidentification. In our (2006) meta-analysis of 15 mugshot studies Deffenbacher, Bornstein and I found the overall proportion of correct identifications from target-present and target-absent arrays following prior mugshot exposure was .43 whereas the comparable figure for the no-mugshot control conditions was .50 correct. In 11 of those 15 studies only innocent people were shown in the mugshots and the negative effects of exposure were even greater: the proportion of correct identifications from target-present and target-absent arrays following mugshot exposure was .48 versus .61 for the no-mugshot control condition. Identification of an innocent mugshot interferes with a witness's memory of the actual target so as to reduce both the hit rate and correct rejection rate for target present and target absent lineups, respectively.

(Mis-)Recognition of Familiar Faces. Research shows that, counter-intuitively, identifications of familiar faces - as with identifications of unfamiliar faces - are influenced by a host of variables, including interaction time, contextual information, expectation, postevent information, and own-race bias. ... these variables simultaneously increase the probability that an individual will identify a given face as familiar and inflate the individual's confidence in the identification, regardless of whether the face in fact is familiar or the identification accurate.

A particularly relevant study of identifications of non-strangers is by Pezdek & Stolzenberg (2014). They recruited sophomores (N 139) from two small private high schools who viewed forty yearbook pictures including (a) twenty students who graduated from their school as seniors (fourth year) when the research participants were freshmen (first year students) (familiar faces—with whom the participants had overlapped for a full school year) and (b) twenty unfamiliar individuals drawn from the senior class of the other high school. Thus, familiar faces at one high school served as unfamiliar faces at the other high school. Participants were asked to indicate whether each face was 'familiar.' Individuals' familiarity judgments were only modestly related to prior contact--accuracy was fairly low (the correct identification rate for familiar faces was 42% while the false alarm rate for unfamiliar faces was 23%. This meant that over one-third of the identifications of "familiar" people were actually misidentifications of strangers.

Unconscious Transference. This term is applied when there is a "transfer of one person's identity to that of another person from a different setting, time, or context" (Read et al., 1990, p. 3). Williams (1963) originally coined the phrase in reference an English murder case, in which an innocent person may have been executed. Williams indicates that one of the eyewitnesses who identified the defendant had briefly seen him before the crime and may have unconsciously transferred the identity of the actual perpetrator to the defendant. A classic study of the confusion of roles was conducted by Buckhout (1974) who staged a mock assault before a group who were later asked to pick the assailant from a group of six photographs including the assailant, an innocent bystander to the assault and four fillers, 40% were able to select the assailant and 25% selected the person who had been at the scene as an innocent. Read et al. (1990) had participants view an event with or without a bystander and had them attempt to identify a target person from a photoarray containing a bystander (rather than the target) and four unfamiliar foils. Twenty-five percent of the witnesess who had seen the bystander misidentified the bystander, as compared with just 12 percent of the control subjects

In our 2006 meta-analysis Deffenbacher, Bornstein and I reviewed eight studies using these types of designs and found that the effect is a reliable one with an overall transference misidentification rate of 27% for previously-seen bystanders versus 17% for the same individuals when they had not been viewed as bystanders.

Lineup Instruction Bias. Instructions given to an eyewitness prior to an identification test can vary in their degree of suggestiveness. Suggestive instructions strongly convey to the eyewitness the impression that the

suspect is in fact in the photoarray or lineup, thereby increasing the likelihood that the eyewitness will make a positive--though not necessarily correct--identification. How can instructions convey this message?

Malpass & Devine (1981a) staged an act of vandalism during a lecture to about 350 undergraduate students, 100 of whom were asked to identify the vandal from one of two live lineups within the next three days. Half of the eyewitnesses were given instructions suggesting the perpetrator was in the array and the remaining eyewitnesses were given an "unbiased" instruction: "The person . . . may be one of the five individuals in the lineup. It is also possible that he is not in the lineup." Among eyewitnesses who viewed a vandal-absent lineup, 78% of those who received biased instructions made a positive identification. Of course, all of whom were incorrect. In contrast, only 33% of those who received unbiased instructions made an incorrect positive identification from the vandal-absent lineup. Thus, significantly more false identifications were obtained with biased instructions than with neutral instructions.

Instruction bias research was reviewed by Steblay in a 1997 meta-analysis of 22 studies involving nearly 2600 witness-participants. She found that biased instructions were particularly harmful in target-absent lineups in which witness accuracy declined from 60% (unbiased lineups) to 35% (biased lineups).

BlindPresentation. Greathouse & Kovera (2009) manipulated whether a lineup administrator had knowledge of the suspect's identity, the type of line-up (simultaneous vs. sequential), the presence of the actual perpetrator in the line-up and the type of line-up instructions (biased vs. unbiased). When the witnesses received biased instructions and simultaneous line-ups, they were more likely to make suspect identifications in non-blind than in blind lineups. The pattern of filler and suspect identifications suggested that the increase in mistaken identifications was the result of non-blind administrators influencing those who would have, under blind conditions, made filler identifications to make suspect identifications instead. Line-up rejections did not significantly increase or decrease as a function of line-up administrator knowledge. Suspect identifications were twice as diagnostic for blind administrations as they were for non-blind administrations.

In a more pronounced demonstration of the effects that a non-blind administrator can have, Alberts, Duncan, Wallace and Penrod (2008) trained administrators to "steer" witnesses to make positive identifications of suspects (both guilty and innocent suspects) and avoid identifications of non-suspects (foils) and to accomplish this steering without arousing the suspicion of witnesses. Steering was highly successful: selection rates for "steered" witnesses were: 57% guilty suspects, 32% innocent suspects and 19% filler identifications versus 18% guilty suspects, 10% innocent suspects and 39% filler identifications. Witnesses were essentially unaware that they had been influenced.

Second Identification Attempts. Dickinson (2006) found—in line with the mugshot exposure effects noted above, that when an innocent suspect appears in both a showup and a lineup, the chances the suspect will be identified increases substantially. Indeed, merely telling a witness that he/she will have a chance for a second viewing may be sufficient to affect the accuracy of the identification (Duckworth & Kreiner, 2009). In a more recent study (Steblay, Tix, & Benson, 2013) participants watched a crime video crime and were asked to identify the perpetrator from perpetrator-present and –absent lineups of the same format (sequential or simultaneous), with a two-week time period between the two lineups. Participants who made choosing errors in the first lineup continued with, rather than corrected, their identification error at the second lineup.

X. Witness Confidence and Witness Accuracy (p. 60)

The problems with respect to witnesses' confidence about the accuracy of their identifications and the actual accuracy of those identifications are manifold:

Jurors Infer Accuracy from Confidence. There is consistent evidence to indicate that the confidence that an eyewitness expresses in his or her identification during testimony is the most powerful single determinant of whether or not observers of that testimony will believe that the eyewitness made an accurate identification

Post-Identification Confidence, if Measured Properly, is Modestly Correlated with Accuracy. Perhaps the most informative study is by Sporer, Penrod, Read & Cutler (1995) who found a confidence-accuracy correlation of .41 among (forensically-relevant) choosers. These finding suggests that witnesses who are highly confident in their identifications are somewhat more likely to be correct as compared to witnesses who display little confidence.

Witnesses are also Over-Confident. Brewer, Keast, & Rishworth (2002) found that eyewitnesses who were very confident of the accuracy of their identifications (95% certain) were only about 70%-75% correct. In a 1987 study by Fleet, Brigham, & Bothwell 75% of Ss who rated themselves as extremely confident were accurate. Sauer, Brewer & Wells (2008) report a 40% error rate among witnesses who make an identification and are 90%-100% confident and a 50% error rate among those who are 70%-80% confident. Sauer et al. (2010) found that 13% of their witnesses, when tested immediately, made a positive identification with 90-100% confidence—their error rate was 20%. 10% of witnesses to the same events--tested after one week--made an identification with 90-100% confidence—their error rate was 25%. %. A recent study by Sucic and colleagues (2015) involving identification of individuals with whom participants interacted for up to a minute showed poor calibration and over-confidence in judgments.

Confidence Malleability. In a dramatic illustration of confidence malleability, Luus & Wells (1994) used a staged-crime to secure false identifications from 136 eyewitnesses. These eyewitnesses viewed a theft in pairs and were separated shortly after the theft. After being separated false identifications were obtained from the witnesses using a photospread (the eyewitnesses were unaware they had made a false identification). After making their identifications eyewitnesses were either told nothing about the identification decision of their co-witness or were given information that their co-witness ostensibly identified the same person, identified someone else, or indicated that the culprit was not in the lineup. They were then asked for their confidence levels. There were dramatic increases in the confidence that eyewitnesses expressed in their false identifications in the condition in which they were told that their co-witness identified the same person (the average confidence on a 10 pt. scale was 8.8 versus 6.9 in the no-information control condition). The lowest confidence levels were found among witnesses who were told that the co-witness had indicated that the perpetrator was not in the array (3.6).

A 2006 meta-analysis by Douglass and Steblay of 20 studies with 2,400 identifications found that witnesses receiving feedback "expressed significantly more . . . confidence in their decision compared with participants who received no feedback." Douglass & Steblay further report that witnesses "reported that they possessed a significantly better basis for making the identification..., greater clarity of the perpetrator's image in mind ..., greater ease of identification..., and needing less time to make their ID... They also reported a better memory for strangers' faces .... and greater trust in the memory of another witness with a similar experience.... Not surprisingly, then, they are also more willing to testify about their identification decision... (p. 863) Furthermore, Douglas et al. (2010) have shown that witnesses receiving confirming post-identification feedback are viewed by others as more accurate and confident than witnesses who have not received feedback.

Each of the factors enumerated above and discussed in more detail below are implicated by the testimony of one or more witnesses in this case. As detailed below, the advantage of having expert testimony on these matters is that the testimony will sensitize jurors to impact of these factors on eyewitness identification reliability and enable them to better assess the evidence present at trial. As shown below, in the absence of expert testimony jurors' evaluations of eyewitness evidence are dominated by a consideration of witness confidence—a factor which is, at best, only modestly informative about witness reliability and at worst, misleading.

XI. Cumulative Impact of Threats to Reliability (p. 68)

I have enumerated a large number of factors which have been linked to eyewitness reliability in research and are involved in this case. A strong case can be made that these factors can cumulatively increase identification errors. There is also evidence that the studies reported here typically underestimate the effects of these factors on performance? Are the effects these factors cumulative or does the presence of one factor make the others irrelevant?

Generalizability of Effects

Shapiro & Penrod (1986) noted that in the studies in their meta-analysis overall performance levels were worse in more realistic eyewitness studies higher in the laboratory studies and that those differences were readily accounted for by systematic differences between more and less realistic studies. Lindsay and Harvie (1988) reported a similar pattern: less-realistic studies appear to systematically over-state levels of witness performance. There is other evidence (see Penrod & Bornstein, 2007 for an overview) that less realistic studies understate the impact of studied variables on witness performance. This evidence emerges from meta-analyses in which researchers have tested whether the effect of the factor that is the main focus of the meta-analysis is larger or smaller under more realistic testing conditions. There are many such demonstrations.

Steblay's (1992) meta-analysis of the weapon focus effect similarly showed that relatively artificial simulations *underestimated* the magnitude of the effect. Deffenbacher, Bornstein, Penrod, and McGorty's (2004) found that the effect of stress was twice as large for staged-crime studies than for studies manipulating stress by other means.

Cumulation of Effects

In studies were several factors are manipulated at one time it is regularly observed that they simultaneously influence witness performance. For example, Cutler, Penrod, O'Rourke and Martens (1986) found, across two studies, that disguise, biased instructions, weapon visibility, retention interval, and lineup size all influenced identification accuracy. Cutler, Penrod & Marten (1987a) found simultaneous effects of disguise, retention interval and mugshot viewing. Cutler, Penrod & Marten (1987b) found simultaneous effects for disguise, weapon focus, retention interval and instructions to witnesses.

Shapiro and Penrod (1986) analyzed performance across the hundreds of experimental conditions and found that even when statistically controlling for the effects of other variables most variables still explained significant portions of variability in performance. With regard to correct identification rates, attention variables and the duration of exposure per face were positively related to hit-rate performance. The number of targets studied and retention interval accounted for significant variance. With respect to identification errors, greater attention led to fewer false alarms, the number of targets studied was positively associated with false-alarm rates, there were many more false identifications when participants were confronted with live targets as opposed to still photographs and there was a negative correlation between the false-alarm rate and number of foils.

In short, there is substantial evidence that the effects of the many factors discussed above can and do have a cumulative effect on identification performance.

Steven Penrod

I. Expertise of Steven Penrod

I am a Distinguished Professor of Psychology at the John Jay College of Criminal Justice of the City University of New York. Prior to my appointment at John Jay in the fall of 2001, I was Professor of Law and Professor of Psychology at the University of Nebraska-Lincoln (1995-2001). There, I also served as director of the Law-Psychology Graduate Program in which students are trained in law (earning a J.D. or MLS) and psychology (earning an MA and Ph.D.). I was formerly Professor of Law at the University of Minnesota Law School (1989-1995) and Professor of Psychology at the University of Wisconsin (1979-1989). I have taught law at the University of Wisconsin Law School and at Indiana University Law School-Bloomington. I hold a B.A. degree from Yale College, a J.D. degree from the Harvard Law School, and a Ph.D. degree in social psychology, also from Harvard University. I have testified as an expert on a variety of social science and law issues (mostly eyewitness issues) in over 150 cases in federal and state venues, including Wisconsin, Minnesota, Illinois, Ohio, Indiana, California, Texas, Oklahoma, New York, New Jersey, Maine, Connecticut, Massachusetts, New Hampshire, Maryland, Virginia, Delaware, the District of Columbia, and Pennsylvania.

With regard to eyewitness issues in particular:

a. I am an author or co-author of nearly 50 eyewitness publications including 30 original research articles published in peer reviewed scientific journals, reviews of eyewitness research, writings about eyewitness research in other contexts (e.g. in my social psychology textbook and articles for practicing lawyers), and a book on eyewitness research.

b. I have made more than 50 presentations on eyewitness research before professional psychological organizations.

c. I have made a number of presentations to other professional groups of lawyers, judges, and police concerning problems of eyewitness reliability.

d. I have regularly taught about eyewitness research in law school and psychology courses. At John Jay College I regularly teach a graduate-level class devoted entirely to eyewitness research.

e. I have supervised more than a dozen undergraduate and masters thesis research projects and two doctoral dissertations concerned with eyewitness memory.

f. I have been the principal investigator on seven research grants (awarded through competitive review processes) that address problems of witness reliability. Six of these grants are from the Law and Social Sciences program of the National Science Foundation and the other was from the National Institute of Justice -- the research wing of the U.S. Department of Justice. The National Institute of Justice research focused on methods to improve witness identification performance.

g. In the past few years I have testified in cases including NY v Hogan (6/16), NY v ?? (6/16 for Marne Lenox), DC V Talbert (6/16), Outing v CT (5/16), NY v Bianchini (4/16), NY v Lewis (3/16), NY v Pedro (3/16), DC v. Smith (2/16), NH v. Rodriquez (2/16), CT v. Kukucka (12/15), NY v. Thomas (10/15), PA v Cortez (10/15), CT v. Banner (9/15), MA v Rodriguez (5/15), NY v Benitez (3/15),CT v Scott (1/15), DC v Robinson (12/14), DC v Parker (11/14), NY v Thomas (10/14), NY v Castro (6/14), CT v Gregory (5/14), US v Jacks (DC 1/14 retrial), NY v Alexander (1/14), CT v Day (12/13), MA v Alicea (12/13), US v Slaughter (DC 11/13), US v Jacks (DC 11/3), US v Fateen (DC 11/13), US v Corbin (DC 9/13), US v ?? (for Stephen Jackson DC 8/13), US v Moore (DC 6/13), US v Thomas (Boston 4/13), NY v ?? (for Victor Bryant 4/13), US v DeLeon (DC 3/13), NY v Ford (3/13), NY v Ragbeer (3/13), US v Butler (DC 2/13), US v Whitley (DC 1/13), NY v Loras (10/12), VA v Auls (9/12), NY v Lebron (7/12), US v Tate (DC 5/12), US v. Manson (4/12), CT vs Rios (2/12), NJ v Johnson (4/11), MA v Ek (Boston 2/11), NY v Hinds (Brooklyn 2/11), CT v Bennett (1/11), NY v Anderson (Bronx

12/10), US V McNatt (DC 12/10), NY v Santiago (Bronx 11/10), NY v Locada (Bronx 9/10), NH v Perri (9/10), US v Campbell (DC 8/10), NJ v Blazas (6/10), NY v Kerrigan (Ithaca 5/10), US v Mozie (DC 3/10 & 7/10), US v Nolan (DC 1/10), US v Cummings (DC 12/09), NJ v Henderson (remand hearing-08/09), US v Lean (DC 07/09), US v Felder (DC 3/09), NY v LeGrand (Manhattan 2/09), NY v Dennis (Buffalo 01/09), CT v Harris (habeas 11/08), CT v Kelly (11/08), NY v Banks (Westchester 8/07), NY v Costa (Manhattan 4/07).

I have been asked by counsel to examine portions of the case file in order to identify factors that could have contributed to a misidentification by the witness in this case and about which I would be (and would have been) prepared to testify at the trial of defendant Nolan. In Sections II through VI below I discuss the general problem of mistaken identifications, describe the growing body of research on factors that contribute to misidentifications, discuss research on the need for and benefits of expert testimony concerning this body of scientific research and discuss the research in relation to admissibility criteria. In sections VII through X below I have highlighted research findings relating to the factors that come into play in this case—in doing so I am not commenting on the credibility of any witness nor expressing an opinion about the reliability of any identification in this case—rather, the research findings provide background information that would be useful to a jury when it makes its assessments of eyewitness evidence and witness credibility. Many of the papers cited below can be found at http://tinyurl.com/eyepapers and opened with the password 'eye' (or 'rdp' in the case of papers on which I am an author or co-author).

II. The Problem of Eyewitness Identification Errors

Archival Studies Show that Mistaken Identification is a Primary Cause of Erroneous Convictions

Several legal scholars, beginning with Borchard (1932), have studied the causes of mistaken identification in over 1,000 criminal cases (see also Brandon & Davies, 1973; Frank & Frank, 1957; Huff, 1987; Huff, Rattner & Sagarin, 1986). Huff (1987) readily concludes, on the basis of studying the 500 cases of erroneous conviction that he identified, that the single leading cause of mistaken conviction was erroneous eyewitness identification of the defendants. He states that eyewitness error was involved in nearly 60% of the cases he studied. Rattner's (1988) analysis of 205 cases of wrongful conviction demonstrated that over 50% were attributable to mistaken identifications (also see Borchard, 1932). The University of Michigan Exoneration Registry--with over 1700 cases--indicates 30% of their cases involved mistaken identifications http://www.law.umich.edu/special/exoneration/Pages/Recent-Findings.aspx. These rates are all the more remarkable given that some commentators estimate that eyewitness identifications are prominent in only 5% of trials (Loh, 1981).

The Predominant Form of Defective Evidence in DNA Exonerations Is Eyewitness Identification.

More recently, the prominence of mistaken identifications as a source of erroneous convictions has been reaffirmed by the results of exonerations based on DNA evidence. By 1998 post-conviction DNA testing had freed 62 persons in the United States convicted by juries of crimes that they did not commit -- 8 of whom were sentenced to death. In Scheck et al.'s (2000) analysis of the first 62 cases, 52 were mistaken eyewitness identification cases with a total of 77 mistaken eyewitnesses *(that is, many defendants were misidentified by more than one witness)*. University of Virginia law professor Brandon L. Garrett has systematically examined the first-200 DNA exculpation cases (the total count as of April 2012 is 289 cases), in which the innocent people served an average of 12 years in prison. Garrett (2008) reports that the leading cause of the wrongful convictions was erroneous eyewitness identification--which occurred in 79 percent of the cases. In a quarter of the cases, eyewitness testimony was the only direct evidence against the defendant. The Innocence Project website indicates, as of August 2009 that half of the 179 misidentification cases (out of 239 exonerations) were based just on misidentification evidence and more than a third of the misidentification cases had 2 or more witnesses who made misidentifications (13% of the reported cases had three or more misidentifications).

III. The Growing Body of Scientific Research on Eyewitness Reliability

The research on eyewitness reliability is of relatively recent vintage. The recent vintage of this research is very important in light of the fact that most of the significant appellate cases that created precedential impediments to eyewitness expert testimony pre-date the vast bulk of the research--attempts to introduce expert psychological testimony on eyewitness memory began to flourish in the early 1970s. Evidence of these efforts can be found in appellate court decisions. In the state courts, two states, Kentucky (*Pankey v. Commonwealth*, 1972) and Massachusetts (*Commonwealth v. Jones*, 1972), upheld their trial courts' decisions to exclude such expert testimony. Trial court exclusion of such testimony was also upheld in an early and widely-cited decision by the U.S. Court of Appeals for the Ninth Circuit (*U.S. v. Amaral*, 1973). The novelty of the research was one of the factors that influenced these decisions and raises the question of what has changed in the past forty-five years?

How recent is the scientific research? Of the more than 200 citations used in a chapter on eyewitness research which I co-authored in 1980-1981, most were to studies conducted between 1975 and 1981. A very narrow full-text search in April 2016, using the PSYCHINFO database, for *peer-reviewed* articles containing the phrases "eyewitness identification" or "face recognition" (searches which eliminate the tens of thousands of scientific studies on other aspects of human memory) reveals that over 4,000 articles (over 2,750 with those phrases in the abstract) which meet the criterion have been published since 1930 (a full-text search on "memory" yields over 217,000 publications--161,000 with "memory" in the abstract). The eyewitness and face recognition articles had the following distribution of publication dates (with hits in abstracts shown in parentheses:

1930's—4 (1)
1940's—0 (0)
1950's—0 (0)
1960's—1 (0)
1970's—55 (23)
1980's—286 (168)
1990's—674 (430)
2000's—1463 (1017
2010-16-1636 (1017)

In short, there is now a large and growing body of scientific research directed specifically at issues relating to eyewitness reliability--a body of research that has mushroomed since 1980. Furthermore, there is also a much larger body of research (numbering in thousands of studies) on human memory generally that provides a broader and deeper empirical and theoretical context for the research that focuses specifically on eyewitness performance and the factors that influence such performance. This growth of research on factors influencing eyewitness performance—and related research on jury decisionmaking in eyewitness cases and research on the effects of expert psychological testimony on eyewitness--issues is further underscored by the number of scholarly books by psychologists that have appeared in recent years.

IV. The Need for Expert Testimony—Juror Knowledge and the Weaknesses of Cross-Examination

Cross-examination is sometimes hailed as a powerful engine for determining truth, but is this true in eyewitness cases? Effective cross-examination requires that juries are sensitive to the factors that influence eyewitness identification accuracy. Suppose that an attorney, through cross-examination, establishes that the crime perpetrator was of a different race than the eyewitness, that the perpetrator was disguised and brandished a weapon, that the eyewitness was highly intoxicated, and that the lineup test from which the suspect was identified suffered from instruction bias, foil bias and presentation bias. What good will this do if the jury does not understand how these factors are likely to influence eyewitness identification accuracy? The attorney can argue during closing argument that these factors enhance the likelihood of false

identifications, but the jury may find such arguments implausible, especially if they perceive the attorney as biased and the arguments as inconsistent with common sense.

Four types of studies examine juror sensitivity to the factors that influence eyewitness identification, all of which are reviewed below. The first type are survey studies that assess lay knowledge using multiple choice questions. The second type examines the abilities of lay persons to predict the outcome of eyewitness identification experiments. The third and fourth involve simulated jury decision making experiments; the third examines the influence of discredited eyewitnesses on mock-juror decisions, and the fourth examines the influence of eyewitness evidence on juror decisions.

Survey Studies of Lay Knowledge. A number of studies, published in multiple articles, have addressed lay (i.e., juror) and professional (lawyers and judges) knowledge about the factors that influence eyewitness identification. Early studies include Deffenbacher & Loftus, 1982; McConkey & Roche, 1989; Noon & Hollin, 1987 and more recent ones include Alonzo & Lane, 2006; Benton, Ross, Bradshaw, Thomas, & Bradshaw, 2006; Lane, Groft, Roussel, & Alonzo, 2007; Mitchell & Haw, 2008; Schmechel et al., 2006. Read & Desmarais (2009) review these studies and present their own data. Across studies it is common to find that 50-65% of respondents chose answers similar to those of experts. While this performance may look relatively good it generally indicates there are significant disagreements among jurors about how factors influence eyewitness performance and, to some extent, the seeming agreement with experts likely arises from "good" guessing by laypersons. Unfortunately, picking answers on a questionnaire is very different from assessing trial evidence where jurors have to generate and apply their own evaluative criteria. As Read & Desmarais observe:

> These (survey) results, however, do not tell us whether community respondents' comprehension of the topics is of the requisite depth to appreciate conceptual distinctions made at trial by eyewitness experts. Nor do they indicate whether jurors would successfully apply their knowledge to the case at hand (cf. Schmechel et al.). In recent unpublished research, Alonzo and Lane (2006) compared survey responses (to the Kassin et al. items) of students to their answers about eyewitness case vignettes and found that survey responses to specific case-relevant features did not well predict actual decisions made by these same participants about the case simulations. With the use of varied formats that centred on some similar issues, Schmechel et al. also concluded that how participants respond to one statement does not necessarily predict how they will respond to another. Indeed, on several True/False items (postevent information, unconscious transference and cross-race bias), Schmechel et al.'s participants responded in a manner highly similar to our participants but then went on to demonstrate inconsistencies on problem-solving questions that involved these same factors.

Judges and juries appear to perform on a par: Wise and Safer (2004) tested 160 judges' knowledge on 14 statements about factors whose effects on eyewitness accuracy are supported by strong empirical evidence. Judges averaged only 55% correct and their knowledge about these factors was unrelated to the number of years they practiced law, whether they practiced criminal law, how long they had served as a judge, and whether they served as a state or federal judge or a trial or appellate judge. The same authors (2010) compared 160 U.S. judges, 57 law students, and 121 undergraduates with respect to their knowledge and beliefs about factors affecting eyewitness accuracy and found judges (55%) no more knowledgeable than undergraduates (58%), and both groups were less knowledgeable than law students (66%) (after controlling for guessing the percentages correct were 10% for judges, 16% for undergraduates and 31% for law students). For all groups, increased knowledge about factors influencing eyewitness performance actors was associated with beliefs that might reduce wrongful convictions. All three groups underestimated what potential jurors know about eyewitness testimony. Wise and Safer concluded that: "The results suggest that increasing judges' knowledge of eyewitness testimony might help them to reduce wrongful convictions and to more accurately assess when eyewitness experts are needed."

There is other evidence that laypersons are far from adept at evaluating eyewitness performance.

Prediction Studies. In prediction studies, subjects are provided with descriptions of the methodology used in eyewitness identification experiments and are asked to predict the results. If subjects are sensitive to the factors that influence identification accuracy, they should be reasonably accurate at predicting study outcomes. However, Kassin's (1979) found that his research participants were not sensitive to the influence of crime-seriousness on identification accuracy nor to the absolute level of the identification accuracy-rates. Wells (1984) reported several prediction studies. In one, subjects **believed** confidence was strongly related to accuracy and the second demonstrated that subjects were not sensitive to the influence of one factor that clearly contributes to the suggestiveness of identification procedures: instructional bias.

Brigham and Bothwell conducted a prediction study with a random sample of 90 community members from Leon County, Florida, all of whom were registered to vote and therefore eligible jurors. Brigham and Bothwell's results further reinforced the findings of Kassin and Wells and indicate that prospective jurors overestimate the accuracy of eyewitness identifications.

Mock-Jury Studies of Juror Decision Making. Most relevant to the question of juror sensitivity are studies which attempt to simulate the jury's actual task of evaluating eyewitness identifications. Researchers have taken several approaches to studying juror sensitivity. I have identified three distinct approaches. The first examines prospective jurors' abilities to discriminate between accurate and inaccurate eyewitnesses. The second examines the influence of credible and discredited eyewitnesses on mock-juror decisions. The third examines mock-juror sensitivity to the factors that influence identification accuracy. Throughout these sets studies the judgments of hundreds of prospective jurors (and some experienced jurors) are examined in response to a wide variety of simulated cases.

Mock Jury Evaluations of Accurate and Inaccurate Eyewitnesses. Wells, Lindsay & Ferguson (1979) had the identification testimony of witnesses evaluated by 201 undergraduates who served as mock jurors. When the questions addressed to the witnesses were non-leading, inaccurate eyewitnesses were believed by more jurors (86%) than were accurate eyewitnesses (76%). In contrast, when the questions were leading, accurate eyewitnesses were believed by more jurors (84%) than were inaccurate eyewitnesses (73%). Among jurors exposed to non-leading cross-examination, 76% correctly identified accurate eyewitnesses but only 14% correctly identified inaccurate eyewitnesses.

Among jurors exposed to **leading** cross-examination, 84% correctly identified accurate eyewitnesses but only 27% correctly identified inaccurate eyewitnesses. Wells et al. also found that the confidence of the eyewitness in his/her identification accuracy correlated significantly ($\underline{r} = .53$) with whether or not the juror believed the eyewitness but **nonsignificantly** ($\underline{r} = .05$) with the actual accuracy of the witness's decision. In other words, jurors were more likely to believe confident eyewitnesses but confident eyewitnesses were no more likely to be accurate than less confident eyewitnesses.

A partial replication of this study by Lindsay, Wells, & O'Connor (1989) tested whether cross-examination of eyewitnesses conducted by experienced attorneys (versus inexperienced attorneys) might aid jurors in differentiating between accurate and inaccurate witnesses. The experienced attorneys (16 attorneys at least five years past their admission to practice, $\underline{M} = 12$ years) and (16) inexperienced senior law students examined and cross-examined witnesses to a staged crime. The direct examinations generally ranged from 5 to 15 minutes and the cross-examinations from 3 to 35 minutes. Mock jurors' beliefs in eyewitness accuracy (as indexed by verdicts) were unrelated to witness accuracy--**jurors could not differentiate accurate from inaccurate witnesses.** Greater attorney experience did not aid jurors in making the differentiation, although jurors perceived a variety of differences in the performances of experienced versus inexperienced attorneys. In this instance, perceived witness confidence was significantly correlated with verdicts ($\underline{r} = .29$) although witness self-rated confidence was not ($\underline{r} = -.07$).

Wells & Leippe (1981) found that the accuracy of eyewitness recall of details was significantly correlated (r = -.56) with juror belief in the eyewitness identification. In other words, the more peripheral details recalled incorrectly, the less likely the identification was believed by the jurors. In short, to a substantial degree mock-jurors evaluated identification testimony on the basis of witness memory for peripheral details. Examination that underscored errors in memory for peripheral details significantly weakened the credibility of accurate witnesses but did not reveal the inaccurate witnesses. This unfortunate set of results is further compounded by the fact that, in Wells and Leippe's study, eyewitnesses' memory for peripheral details was inversely associated with identification accuracy!

Lindsay, Wells & Rumpel (1981) also examined mock jurors' abilities to discriminate accurate from inaccurate eyewitnesses. Thefts were staged before 108 undergraduates, each assigned to one of three viewing conditions designed to produce low, moderate and high levels of identification accuracy. Eyewitnesses later attempted to identify the thief from six-person photoarrays. A sample of eyewitnesses who made positive identifications were then cross-examined while being videotaped. The viewing condition manipulation was successful: of the eyewitnesses who made a positive identification, 33% in the low accuracy, 50% in the moderate accuracy and 74% in the high accuracy conditions were correct. These percentages differed significantly from one another.

The videotaped cross-examinations of eight accurate and eight inaccurate eyewitnesses from each viewing condition were then shown to 96 undergraduates--77% of confident witnesses were believed, versus 59% of low confidence witnesses. Overall, 62% of the low accuracy condition witnesses were believed, 66% of the moderate accuracy condition witnesses were believed and 77% of the high accuracy condition witnesses were believed. **Thus, jurors unfortunately thought more witnesses were correct than was merited by the performance of the witnesses in the different witnessing conditions**. Furthermore, the jurors gave the witnesses much more credence than was merited by the levels of accuracy of the witnesses they actually viewed--half the eyewitnesses selected from each witnessing condition had actually made correct identifications and perfect performance by jurors would thus have produced 50% belief rates for each of the three conditions.

Witness confidence and witnessing condition also interacted: among eyewitnesses with high confidence, viewing condition had a trivial influence on juror beliefs: 76% of eyewitnesses in the low accuracy condition, 76% in the moderate accuracy condition and 78% in the high accuracy condition were believed. In contrast, among eyewitnesses with low confidence, viewing condition had an impact on juror beliefs. The corresponding percentages of eyewitnesses believed were: 47%, 54% and 76%, respectively. Thus, jurors ignored witnessing conditions when the witness was very confident, but gave the witnessing conditions consideration when the witness was not highly confident. **Jurors appear to suspend their critical powers when confronted by confident witnesses.**

Although the jurors were somewhat sensitive to witnessing conditions, they were not more accurate in their overall assessments of witnesses across the three witnessing conditions--accuracy levels (collapsing across correct and incorrect identifications) were roughly 50% in all three conditions. What happened was that jurors generated a different mix of errors across conditions. In fact, the "improvements" in identifying correct eyewitnesses were fully offset by reduced levels of accuracy in picking out witnesses who made incorrect identifications (39%, 34%, and 25% respectively).

There are two unfortunate aspects to these results. First, to the extent the criminal justice system differentially eliminates witnesses low in confidence from the prosecution process (because, for example, prosecutors are hesitant to proceed with cases based on identifications by less confident witnesses) these results suggest that jurors may commonly find themselves in a situation where they are inclined to rely on (high) witness confidence and not critically examine the circumstances under which an identification was made. Second, Lindsay, et al. found only a weak relationship between witness confidence and witness

accuracy (r =.26), thus the jurors in this study were relying on less than fully diagnostic information when using confidence to gauge witness accuracy.

Lindsay, Wells & O'Connor (1989) conducted an experiment to examine whether the findings of their previous research would generalize in a more realistic trial situation. Simulated trials were shown to 178 undergraduates, each of whom viewed one taped trial. Mock jurors rendered verdicts and answered other questions about the trials. The conviction-rate did not differ significantly as a function of accuracy of the eyewitness (jurors could not differentiate accurate from inaccurate eyewitnesses): guilty verdicts were rendered by 68% of subjects exposed to eyewitnesses who made correct identifications and 70% of subjects exposed to eyewitnesses who made false identifications. The degree of experience of attorneys did not significantly influence verdict nor did experience interact with accuracy of eyewitness in the prediction of verdict.

The studies of mock-jurors' abilities to differentiate between accurate and inaccurate eyewitnesses converge on a dismal conclusion about jurors' abilities. Jurors overestimate the accuracy of identifications (there are more convictions than there are accurate identifications), jurors fail to distinguish accurate from inaccurate eyewitnesses, jurors tend to ignore viewing conditions that are known to predict identification accuracy and instead based their decisions in part on eyewitness memory for peripheral details and witness confidence--both of which tend to be poor predictors of identification accuracy.

Mock Jury Studies of the Factors That Influence Juror Decisions. A number of studies have examined variations in trial evidence that might affect juror assessments of eyewitness identifications. Lindsay, Lim, Marando and Cully (1986) found that in the presence of conflicting eyewitness identifications, alibis influenced verdicts, but witness consistency and witness viewing time did not .

Bell & Loftus (1989) found that detail of testimony influenced subjects' verdicts, but given that eyewitness research (Cutler, Penrod & Martens, 1987a; Wells & Leippe, 1981) shows that memory for physical characteristics and peripheral details does not predict eyewitness identification accuracy, these data provide further evidence that jurors are insensitive to some of the factors that influence eyewitness identification accuracy and inappropriately sensitive to factors that are not diagnostic of eyewitness accuracy.

Cutler, Penrod & Stuve, 1988; Cutler, Penrod & Dexter, 1990) also conducted a mock jury experiments to examine the factors that jurors use to evaluate eyewitness identification evidence. A simulated trial was shown to 321 University of Wisconsin undergraduates and 129 former jurors from Dane County, Wisconsin. The trial concerned a defendant accused of the armed robbery of a liquor store. **A number of forms of evidence were systematically manipulated in these trials (e.g. disguise, weapon focus, level of violence, retention interval, instruction bias, foil bias, and witness confidence). Only confidence influenced verdicts despite the fact that other studies reveal that eyewitness confidence and identification accuracy are only modestly related** (e.g., Bothwell, Deffenbacher, & Brigham, 1987). Detailed analyses of juror memory for the evidence (see Cutler, Penrod & Stuve, 1988) indicates that the subjects paid attention to the testimony and recalled it with high accuracy rates, hence, lack of attention and poor memory cannot explain the null effects of eyewitness evidence on mock-jurors' decisions. In addition, this research indicates that the judgment processes of eligible and experienced jurors are comparable to those of college student subjects and supports the generalizability of the research described above.

Conclusions

In sum, there are many reasons to be concerned about the quality of jury decisionmaking in eyewitness identification cases—in the absence of expert testimony.

1. Jurors apparently have difficulty reliably differentiating accurate from inaccurate eyewitnesses.

2. A major source of juror unreliability is their reliance on witness confidence--which is:

a. A dubious indicator of eyewitness accuracy even when measured at the time an identification is made, and

b. Appears to be highly malleable and influenced by post-identification factors such as repeated questioning, briefings in anticipation of cross-examination, and feedback about the behavior of other witnesses. These factors cannot increase witness accuracy and are therefore likely to further reduce any relationship between witness confidence and accuracy.

3. Jurors appear to overbelieve eyewitnesses.

4. Jurors are not adequately sensitive to aspects of witnessing and identification conditions that are arguably better predictors of witness accuracy than is witness confidence but are sometimes sensitive to factors (such as recall of peripheral details) that are not diagnostic of witness accuracy.

V. Eyewitness Expert Testimony Helps Jurors

Some judges believe that expert testimony will confuse the jury. Others believe that it will prejudice the jury. I have tried to classify the possible effects of expert testimony and consider these effects below. Judicial impressions about the possible effects of expert testimony are somewhat speculative, although the issues raised in these speculations can, in fact, be addressed empirically. Recognition of the empirical questions has prompted some researchers to bring data to bear on the question of what effects expert testimony has on jury decision making.

The Expert's Possible Effects on the Jury

Plausible effects of expert testimony can generally be classified into three categories: juror confusion, juror sensitivity, and juror skepticism.

Juror Confusion. The first possible outcome is that expert testimony will have no effect whatsoever on the judgments of jurors. Though pessimistic, this hypothesis is really quite reasonable given that jurors have been shown to have difficulty in understanding and applying a variety of legal concepts at virtually every stage of the trial process (Penrod & Cutler, 1987).

Juror Sensitivity: Knowledge and Integration. If expert testimony does in fact influence juror decision making, what effect should it have? Clearly a desirable effect is to improve juror sensitivity to the factors that influence eyewitness memory (McCloskey et al., 1986; Wells, 1986). Sensitivity refers to the knowledge of how a given factor influences eyewitness memory and the ability to render decisions in accordance with that knowledge. Thus, sensitivity contains two components: knowledge and integration. Knowledge refers to awareness of the manner in which a factor influences eyewitness memory, including the direction and magnitude of the effect for a given factor. Integration, in this context, refers to the ability to render decisions that reflect knowledge.

How are knowledge and integration pertinent to the issue of juror sensitivity? It might be the case that jurors are unaware of the manner in which some factors influence eyewitness memory. For example, the survey studies described in the previous chapter revealed that jurors are insensitive to the equivocal effects of training on eyewitness identification accuracy. But they are somewhat sensitive to the influence of cross-race recognition. Even if jurors are aware of the relative effects of a given factor on eyewitness memory, the magnitude of that effect might be attenuated in the juror's integration of the evidence. In other words, the jurors' judgments might not reflect their a priori beliefs. Decision making research in a variety of psychological domains (e.g., Goldberg, 1968) shows that integration is quite difficult to achieve, even by trained experts.

The mock jury studies discussed above showed that jurors are insensitive to many forms of eyewitness evidence, but it is not clear whether this insensitivity is due to lack of knowledge, poor integration skills, or

some combination of the two. One plausible effect of expert testimony is that it could improve both knowledge and integration of eyewitness evidence.

Juror Skepticism. Though it is agreed that improved juror sensitivity is a desirable effect of expert testimony (McCloskey et al., 1986; Wells, 1986), there is considerable disagreement as to whether jurors should be made more skeptical of the accuracy of eyewitness identifications. There is ample evidence that eyewitness identifications are often inaccurate. As mentioned above, realistic field experiments (e.g., Brigham et al., 1982; Krafka & Penrod, 1985) show that witnesses give correct judgments on identification tests approximately 50% of the time. The prediction studies and Wells' studies of mock jurors' abilities to discriminate between accurate and inaccurate eyewitnesses provide some evidence that jurors "overbelieve" eyewitnesses, but few conclusions can be reached about the desirability of a skepticism effect.

Positive Effects of Expert Psychological Testimony

We have seen that jurors are largely insensitive to variations in trial evidence that ought to permit them to (at least partially) differentiate between good and poor eyewitnessing conditions (and therefore, between accurate and inaccurate eyewitnesses). The critical question is whether expert testimony enhances jurors' abilities to make those differentiations. A perhaps less critical issue is whether expert testimony simply makes jurors more skeptical of eyewitness evidence but does not produce enhanced differentiation of good versus poor witnessing conditions.

Early expert testimony research revealed some consistent findings with respect to expert testimony. Most evident is that reduced belief and fewer convictions are obtained if expert testimony is presented (Fox & Walters, 1986; Hosch et al., 1980; Loftus, 1980; Maass et al., 1985; Wells et al., 1980).

For example, in Loftus (1980, expt 1) participants read a summary of a case in which they learned some details about an attack and the circumstances surrounding an eyewitness identification. Some participants heard about a nonviolent incident, in which the victim managed to wrestle away the assailant's pistol before the assailant fled. Other participants heard a violent version of the incident, in which another person came to assist the victim. Before fleeing, the assailant fired two shots at the second person, who died instantly. A psychologist testified that there were several factors in the criminal incident known to produce difficulties for an accurate identification: cross-race, stress, presence of a weapon, and drinking. Only stress actually varied across participants.

Table 1
Percentages of Guilty Verdict

Expert psychological testimony	Type of crime	
	Violent	Nonviolent
No	68	47
Yes	43	35

Expert testimony led to a 12% reduction of guilty verdicts in the nonviolent case (where cross-race identification and drinking came into play), and a 25% reduction of guilty verdicts in the violent crime where heightened stress and enhanced weapon-focus came into play. Sensitivity and skepticism are both apt under these conditions.

Fox and Walters (1986) exposed 128 undergraduates to videotaped segments of eyewitness testimony and expert testimony. The witness expressed either high or low confidence. Three conditions of expert testimony were crossed with the eyewitness conditions: no expert testimony, general expert testimony, and specific

expert testimony. The general expert testimony included identification accuracy rates obtained in previous experiments, general memory processes (acquisition, retention, and retrieval), and types of memory (sensory, short-term, and long-term). Specific testimony, on the other hand, consisted of similar testimony, but instead of general memory processes the expert psychologist discussed the effects of 12 specific factors that are known to influence eyewitness memory (e.g., physical factors, exposure time, retention interval, stress, weapon focus, the fairness of lineup procedures). In addition, in all expert testimony conditions the expert psychologist discussed the weak relation between confidence and accuracy. The percentages of mock jurors who believed the eyewitness in the high and low confidence conditions were 70% and 55% among those who heard no expert testimony, 50% and 18% among those who heard general expert testimony, and 30% and 5% among those who heard specific expert testimony. Participants rated the culpability of the defendant on a 10-point scale. General (M = 4.81) and specific (M = 4.23) expert testimony led to significantly lower culpability ratings in comparison to the no-expert testimony condition (M = 6.07). This pattern of results is what one would expect where the expert testifies about a modest relationship between confidence and accuracy (the other manipulated variable) in addition to testifying about matters that would, quite logically, produce skepticism about the eyewitness identification.

In studies like these it is not always clear whether reduced belief is due to improved sensitivity to factors that might have impaired the witnesses ability to make a correct identification, to enhanced skepticism, or to both. The only experiments that simultaneously and independently varied witnessing factors that influence identification accuracy and the presence of expert testimony were those by Loftus (1980) and Wells et al. (1980), and both show trends toward improved sensitivity. It is possible to independently examine skepticism and sensitization effects, and it is possible to detect juror confusion, as well. Tests of sensitizing effects require that subjects be presented some combination of expert versus no-expert testimony **and** good versus poor witnessing conditions.

For example, in Wells & Wright (1983) mock jurors heard testimony from a witness (24 different witnesses were sampled from a larger number of eyewitnesses who were tested under poor, moderate and good witnessing conditions) and either did or did not hear expert testimony. The results (including the baserate of accuracy for witnesses in poor, moderate and good testing conditions) are shown in the following table. As in some earlier studies (Lindsay. Wells, & Rumpel, 1981; Wells & Leippe, 1981; Wells, Lindsay, & Ferguson, 1979; Wells. Lindsay, & Tousignant, 1980), participant-jurors in the no-expert conditions were as likely to believe the identification testimony of inaccurate witnesses as they were to believe accurate witnesses. With expert testimony, however, there was an average of 15% difference in the belief of accurate as compared to inaccurate witnesses. In addition, the no-expert conditions not only failed to produce significant differences in juror belief between good and poor viewing conditions the pattern of belief across viewing conditions was not systematic. The expert conditions, however, yielded systematic differences between good and poor viewing conditions.

In order to further address these issues Cutler, Dexter & Penrod, (1989 and Cutler, Penrod & Dexter, (1989) designed experiments to examine two of the three hypotheses (sensitization and skepticism) concerning the effects of expert testimony on jurors' judgments. Witnessing and identification conditions (WIC), witness confidence, and the presence of expert testimony were varied systematically, thus permitting independent tests of sensitivity and skepticism.

A videotaped trial was used. The expert testimony was very realistic and the expert was rigorously cross-examined. Three factors, each having two levels, were manipulated in the videotaped trial: witnessing and identification conditions, witness confidence, and expert testimony. In the "poor WIC" condition the eyewitness and police officer testified that the robber was disguised (i.e., wore a hat that covered his hair and hairline), the robber outwardly brandished a handgun (presumably invoking a weapon focus effect); the retention interval between the crime and the identification was 14 days, and the officer in charge of the lineup did not explicitly offer the witness the option of rejecting the lineup (suggestive lineup instructions).

In the "good WIC" conditions the witness and police offered testimony that the robber was not disguised, that the handgun was hidden throughout the robbery, that the retention interval was two days, and that the lineup instructions were not suggestive. The witness testified either that she was 80% or 100% confident that she had correctly identified the robber. In conditions containing expert testimony, the expert gave the testimony described above. In conditions containing no expert testimony, the prosecuting and defense attorneys nonetheless reiterated the witnessing and test conditions surrounding the identification in order to maximize their effects on jurors' decisions in the no-expert control group. After viewing one version of the trial, mock-jurors rendered verdicts and rated the credibility of the eyewitness and the strength of the prosecution's and defense's cases. Ratings were recorded on seven-point scales.

Subjects were 96 eligible and experienced jurors who were called for jury duty in Dane County, Wisconsin. All subjects were recruited by telephone within one year of having served (or having been called to serve) on a jury. Data from the 96 subjects were combined with data from a sample of 538 undergraduates. Combining these two subsamples ($N = 634$) allowed us to test the effects of expert testimony with maximum power and permitted us to test whether expert testimony differentially affects eligible jurors' and undergraduate jurors' decisions.

Expert testimony produced sensitizing effects on witness credibility ratings and on prosecution and defense case strength ratings. Among jurors who heard expert testimony, witness confidence produced a weaker effect on eyewitness credibility ratings ($d = .17$) and on defense case strength ratings ($d = .02$) than for jurors who heard no expert testimony ($d = .50$ and .26, respectively). Jurors exposed to expert testimony were less likely to use witness confidence in evaluating the credibility of the eyewitness than were jurors not exposed to expert testimony. Likewise, among jurors who heard expert testimony, WIC had a greater impact on both prosecution ($d = .49$) and defense ($d = .56$) case strength ratings than among jurors who heard no expert testimony ($d = .11$ and .16, respectively). Jurors exposed to expert testimony used WIC to a greater extent in evaluating the strength of the prosecution's and defense's cases than did jurors not exposed. Thus, these findings show that expert testimony sensitizes jurors to the importance of WIC and the relative lack of importance of witness confidence.

There was little evidence for expert-induced skepticism. Expert testimony produced no main effects on eyewitness credibility ratings, prosecution case strength ratings, or verdicts. Inclusion of the expert testimony did improve the defense case strength ratings. This effect was greater among eligible jurors than among undergraduate jurors.

The results of this study and earlier studies provide support for expert psychological testimony in eyewitness cases. Without such testimony, jurors reveal poor knowledge and/or integration of knowledge about eyewitness problems. Further, there is little evidence that expert testimony caused jurors to become more skeptical. The Cutler, et al. study also addressed the issue of external validity and whether research with undergraduate jurors is justified. Indeed, the study found that eligible and experienced jurors were essentially comparable to undergraduate jurors. The nonsignificant differences observed in the study should be considered in light of its design and the very large sample size ($N = 634$), both of which increase the likelihood of detecting such differences.

Conclusions

Taken together, these studies indicate that expert psychological testimony serves as a safeguard against mistaken identification. There is little empirical evidence that jurors are confused by the testimony or are prejudiced by it and measures of recall of expert testimony in the studies where this has been measures indicate that jurors do recall and understand the testimony. Expert testimony appears to have the beneficial effect of educating jurors about factors that influence eyewitness identification and enhancing their reliance on those factors when rendering decisions in eyewitness cases. Indeed, results indicate that expert testimony on eyewitness memory can work on the behalf of the prosecution as well as the defense

VI. Research Findings and Expert Testimony Meet Admissibility Criteria

Frye: The eyewitness research community (which includes several researchers, such as myself, who have dual training in law and psychology) has been sensitive to the question of the admissibility of testimony about eyewitness research findings. Does this research meet the scientific standards required by the courts? One can address this question from multiple perspectives. Under the traditional *Frye* standard the relevant question would be whether the testimony is generally accepted within the relevant scientific community (a standard which, arguably, permitted experts to achieve admissibility if they could point to other experts who agreed—even if the testimony had no scientific basis. Some of the earliest reversals/admission of expert eyewitness testimony came in *Frye* jurisdictions (e.g., *People v. McDonald*, 1984; *State v. Chapple*, 1983).

FRE: The Federal Rules of Evidence refined *Frye*: Rule 702 specifies another criterion for admissibility. Rule 702 states that expert testimony is admissible if:

(a) the expert is qualified;
(b) the testimony assists the trier of fact;
(c) and the expert's testimony is sufficiently reliable.

The federal rules adopted a standard that requires the expert testimony "assist" the jury. Does eyewitness research meet these standards (*Frye*, FRE)?

Is eyewitness research predicated on the scientific method?

The answer is an unequivocal "YES." Virtually all of the empirical eyewitness research conducted by psychologists makes use of standard experimental methods employed in all the experimental sciences. A hallmark of this research is the falsifiability/testability of research hypotheses that are tested using experimental research methods in which the variables or processes examined by researchers are carefully controlled by the researchers in order to assess their causal effects on outcome variables (such as identification accuracy). Virtually everyone who has earned a PhD in psychology in the past 40 years has been trained to use scientific research methods. Use of appropriate research methods is an essential requirement for publication in peer-reviewed scientific journals across all scientific disciplines and psychology is no exception. The results and conclusions summarized below are the products of precisely the methods underscored by the Supreme Court in *Daubert*.

The research studies relied upon here have typically survived two levels of peer review. Most of the research upon which the proffered testimony is predicated is the product of research supported by funding sources such as the National Science Foundation, the National Institutes of Mental Health, the National Institute of Justice, the Research Council of Canada, and equivalent agencies in Great Britain, Australia, and Germany (the vast bulk of the research has been conducted by researchers from these six countries). These national funding agencies typically subject research proposals to a review process in which anonymous evaluations are solicited from a half-dozen to as many a twenty scientific reviewers. Proposals are evaluated for soundness of research design and analysis and the contributions they are likely to make to our understanding of the processes under study. At an agency such as the Law and Social Sciences program at the National Science Foundation only one in five such proposals receive funding.

Once data collection and analyses are completed and the results are written up for publication a second round of peer review begins. Articles are submitted to a single scientific journal for peer review (in contrast to the publication process in law journals where an author could, in fact, submit the same article to any of the more than three hundred law reviews--which are overwhelmingly student edited--and wait for one of them to accept the paper). The editor of the journal will typically solicit three anonymous outside reviews of each submitted manuscript (and will also evaluate the manuscript herself). Relatively few articles are accepted for publication (the rejection rate in most psychology journals is around 80%). Authors of rejected manuscripts

may choose to revise their manuscripts and submit them to another journal--where the manuscript will once again go through the peer review process.

Although some original research first appears in edited scientific books and is not subjected to as rigorous a form of peer review, these chapters typically undergo review by the volume editors and therefore reflect the input of peers who were not directly involved in the research.

There is a consensus on the content of expert testimony?

Courts have traditionally required that the content of expert testimony reflect scientific principles generally accepted in the field, though the more modern trend, reflected in the Supreme Court's 1993 decision in *Daubert* is not to look exclusively to general acceptance but to consider the scientific validity of the procedures that have produced the knowledge represented in the expert testimony. A reliable and valid assessment of consensus in the field requires a systematic sampling of opinion.

Yarmey and Jones (1983) were the first to attempt to address the level of consensus empirically. They provided 16 eyewitness experts with hypothetical scenarios and forced-choice response format to assess their predicted outcomes. High levels of agreement were obtained on many topics.

Kassin, Ellsworth & Smith (1989) replicated and expanded significantly upon Yarmey and Jones' findings. They conducted a large-scale survey of eyewitness experts from the U.S., Canada and Europe. A total of 63 experts responded to the survey. Each respondent completed a 24-page questionnaire in which (s)he evaluated the reliability of 21 eyewitness phenomena and provided personal information concerning her or his educational background, employment, publications and experience as an eyewitness expert. The vast majority of the respondents had Ph.D.s, and the average number of relevant publications was 6.35 (most of which were in scientific journals). Most (56%) had testified as experts on eyewitness memory at least once. In total they estimated having testified on 478 occasions: 364 times for the defense in criminal cases, 29 times for the prosecution in criminal cases, 54 times for the plaintiff in civil cases and 31 times for the defendant in civil cases.

Kassin, Tubb, Hosch, & Memon (2001) replicated and extended this study using somewhat different questions and found the following levels of agreement among 64 experts (ninety-two percent had published one or more books, chapters, or articles on the psychology of eyewitness identification. On average, respondents had authored or edited 2.15 books, 6.54 chapters, 13.22 scientific journal articles, 1.42 law review articles, and 5.38 magazine or newsletter articles).

Recently Daftary-Kapur (2013) and I twice surveyed 71 leading eyewitness researchers (in 2007 and 2012). The experts in the current study are even more accomplished than those in the prior studies. On average, by 2012, the experts had published 30.7 scientific journal articles, 3.2 books, 10 book chapters, and 4.9 law review articles. Overall, our experts had been asked to testify *at least* 2,719 times (the actual number could be much higher as the survey instrument, which was administered over the intover 4,500 times Not all the participants were eager or willing to testify in court. The 2007 survey indicated experts agreed to testify 66% of the time and among those who agreed, actually testified 88% of the time.

Daftary-Kapur and I asked about the following phenomena and obtained the results shown in the table:

- Wave I topics (2007)
  - Mug-shot induced bias
  - Cross-race bias
  - Weapon focus
  - Unconscious transference
  - Alcohol intoxication
  - Lineup fairness
  - Showups
  - Description matched lineups
  - Stress
  - Elderly witnesses
- Wave II topics (2012)
  - Alcohol intoxication
  - Line up fairness
  - Showups
  - Stress
  - Elderly witnesses
  - Identification Speed
  - Description Matched Lineups
  - Lineup Fairness
  - Confidence accuracy
  - Forgetting curve
  - Exposure time
  - Blind administration
  - Non-identification
  - Disguise
  - Change blindness

	Is it reliable?			Would you testify?		
	Kassin (2001)	2007	2012	Kassin (2001)	2007	2012
Mugshot-Induced Bias	95	94		77	87	
Cross-Race Bias	90	94		72	89	
Weapon Focus	87	87		77	83	
Unconscious Transference	81	84		66	75	
Alcohol intoxication	90	85	77	61	71	61
Presentation format	81	81	82	64	73	70
Showups	74	78	82	59	74	74
Stress	60	75	80	50	65	74
Elderly witnesses	50	66	65	38	62	55
Lineup Fairness	70		65	54		58
Confidence malleability	95		100	79		93
Forgetting curve	83		86	73		79
Exposure time	81		91	68		84
Blind administration	0		86			82
Non-identification			46			42
Disguise			98			92
Change Blindness			55			46

Other sources of information indicating consensus: One's appreciation of the degree of consensus within the scientific community is shaped by at least two other important sources of information: the way people write about research findings and the way they talk about the findings in formal and informal settings. With respect to talking, I would note there are scores of opportunities to hear researchers talk about research findings during formal conference presentations (both talks and poster presentations) and during informal conversations at conferences. As an example, in June 2011 my colleagues at John Jay College hosted the bi-annual meeting of the Society for Applied Research in Memory and Cognition in New York City. There were approximately 375 registrants and more than 100 research presentations relating to eyewitness issues. Together, the annual meetings of the American Psychology-Law Society and the European Association of Psychology and Law regularly have more than 1000 registrants and more than 200 eyewitness presentations. These presentations and informal conversations complement writings and surveys as a basis for my judgments about consensus within the research community.

In sum, converging evidence indicates that considerable consensus does exist regarding the influence on eyewitness memory of a wide variety of factors.

VII. Subject Matters for Expert Testimony in the Present Case

In the remainder of this document I identify topics and research about which I would be prepared to testify in the present case. I believe, in light of the case facts with which I am familiar (see my short summary below and prior to each topical section) the matters discussed in subsequent sections are relevant to this case.

The primary witnesses in the case are Lorraine Scroggins, Christopher Martinez, Sandra Martinez and Desiree Scroggins—interview forms from January 2014, indicate Lorraine and Desiree are Black and Christopher and Sandra are Hispanic.

*The major **events** in the home invasion include--*

From Agent Winston's Report of Investigation date 2/18/14 we learn:
"2). Ms.(Lorraine) Scroggins said she was asleep in her bedroom when she awoke to a brown skinned Hispanic male standing in her room with a gun pointed at her. The man had a spanish (sic) accent and asked Ms. Scroggins for the money and the weed in English. Ms. Scroggins said the male was on his cell phone speaking in spanish to someone he was asking her for the money and drugs. Ms. Scroggins said she told the man there was no money or drugs and he took the gun and pointed it at her head and said where is the money? Ms. Scroggins who is a paraplegic said the man began to search the closet and then under her mattress where she was sitting. When the man found nothing he told her, "don't make me flip you off this bed". Ms. Scroggins said the man left her alone in her room but she could hear him in other parts of the apartment moving things around looking for money and drugs. Ms. Scroggins said she heard the male tell the person on the phone, "there is nothing here, I'm gonna shoot her".

3) Sometime later another male she described as white, entered the room and asked her for "the laptop". Ms. Scroggins said she had an iPad on her lap but because of the type of cover the iPad has he couldn't see it because it blended with the bed spread. The second male searched the room and took a first generation iPad and two phones, a Blackberry and a Samsung 3G, both white in color. Ms. Scroggins thinks that Blackberry phone number was XXXXX. The two robbers took electronics, jewelry and clothes .... Ms. Scroggins said she could not see what happened as she cannot walk but she could hear and was later told that the robbers tied the three bedroom doors closed so that her daughter (Desiree Scroggins), her daughter's boyfriend (Chris Martinez), their toddler daughter, Mr. Martinez' mother (Sandra Martinez) and the home attendant couldn't exit the rooms they were in. Ms. Scroggins said they were all tied up. Mr. Martinez had been locked in the sons bedroom alone. Ms. Scroggins' son Robert was at work in Manhattan when the robbery occurred. According to Ms. Scroggins everyone in the apartment was tied up except Ms. Martinez who was holding the toddler in her lap."

In an ROI dated 2/18/14 Agent Winston indicates:
"Ms.(Desiree) Scroggins said she went out into the hallway in the apartment and saw a Hispanic male holding the wires to the internet in his hand. Ms. Scroggins said the male was wearing a green sweatshirt and motioned for her to "shhhhh". Ms. Scroggins said the male then pulled out a gun and she screamed. At that point, Ms. Scroggins said the male hit her in the head with the gun and she thinks she passed out. She described the male in the green sweatshirt as a tall, white Hispanic male with blue eyes, between 26 and his early 30's. ... Ms. Scroggins said she could hear mother screaming and yelling when another male wearing a black jacket came into her room with a gun in his hand. Ms. Scroggins described him as a heavy set, Hispanic male, with some type of covering over his face a ski mask or scarf covering part of his face. ... Ms. Scroggins said both males had guns..."

In one of agent Winston's POIs dated 2/19/14 we learn that:
"Ms. (Sandra) *Martinez said that on December 16, 2013, she went to see her son at his girlfriends' apartment at about 2:15pm. Ms. Martinez said she went to smoke a cigarette with Desiree and went back into the apartment and then into Desiree's bedroom where they were playing video games and talking on the phone. At some point Desiree left the room to go check on the internet and she heard her scream. Ms. Martinez said her son brought Desiree into the room and she was bleeding. Ms. Martinez said she saw the man in the green hoodie kick Desiree while she was on the ground. Ms. Martinez said she heard her son say,"You hit my girl", at which point Ms. Martinez said she picked up her granddaughter and held her in her lap. At that point Ms. Martinez said the other male robber wearing black told the man in the green hoodie "tie them up". One of the men brought the home attendant into the room and the man in the green hoodie tied her up. The man in the green hoodie kept asking "where is the drugs and the money". Ms. Martinez said one of the men referred to her as "Mimi" which is her nickname. Ms. Martinez said she told the man she didn't know anything about any money. The man in the black jacket was outside the room and Ms. Martinez said you could hear him searching the apartment.*

In Winston's ROI of 2/19/14 Christopher Martinez reported:
"When he walked into the hallway he said he saw his girlfriend lying on the floor bleeding and a man wearing a grey sweatshirt with a gun in his hand. He then saw a second man wearing a green hoodie and leather jacket also holding a gun telling him to "shhhhhh". Mr. Martinez said the man with the green hoodie was holding a .38 snub-nosed gun. ... Mr. Martinez described the man with the leather jacket and green hoodie as light-skinned hispanic male with a mustache wearing a skull cap and gloves."

In a report dated 12/19/13 Officer Deloren indicates the Deyanira Beriguette (caretaker for Lorraine Scroggins) said "She heard a knock at the door. .... Two unknown male Hispanics armed with firearms pushed their way into the apartment, placed her on the floor and bound her hands. ... the males had their hoods pulled down and could not provide a description of the perps."

The initial **identifications** *in this case appear to have occurred as follows (I ignore subsequent identifications on the grounds that they are dependent on prior identifications—for reasons explained below):*

A Complaint Form with an activity date of 1/27/14 indicates:
"1 On January 27,2014, at approximately 1040 Hrs., the undersigned... showed CV, Desiree Scroggins a group of photos, including Ralph Nolan, NYSID #07428856M. She stated that Ralph Nolan "looks a lot like" one of the perpetrators that robbed her but wasn't positive.
2. The same group of photos was then shown to CV, Lorraine Scroggins, separately in another room. She positively identified Ralph Nolan as one of the perps that entered her apartment and robbed her."

Trial testimony established that Desiree and Lorraine Scroggins viewed Mr. Nolan's Facebook page at the time they made their identifications, that Ms. and Mr. Martinez were told about the identifications and viewed the Facebook page prior to their own identifications (see summary below at Section IX).

In an agent Winstom ROI of 2/19/14 we learn:
Ms. Martinez was shown a photo array containing a picture of Ralph NOLAN. During the course of this investigation, NOLAN was identified as a possible suspect in this robbery. Ms. Martinez identified NOLAN as one of the men who committed the home invasion at the Scroggins apartment on December 16,2013. Ms. Martinez said she and her son have known NOLAN from the neighborhood but said hadn't seen him in years.

In trial testimony officer Deloren testified that the Sandra Martinez identification was made on January 28 and she said "He looks like the guy."(pp. 530-531)

In another Winston's ROI of 2/19/14 we learn:
"During the same meeting (on 2/10/14), *Mr., Martinez viewed a photo array containing a picture of Ralph NOLAN. During the course of this investigation, NOLAN was identified as a possible suspect in this robbery. Mr. Martinez identified the picture of NOLAN as one of the men who committed the home invasion at his girlfriends' house. Mr. Martinez said he has known NOLAN for years but hasn't seen him in at least 5 years."*

In trial testimony Mr. Martinez indicates that he knew that his mother had picked someone from a photoarray prior to his viewing (pp. 271-272)

The trial transcript (pp. 192-193) indicates Ms. Beriguette was shown photographs but did not recognize anyone.

Low Rates of Eyewitness Identification Accuracy

How often do witnesses make mistakes? Such information can be useful to jurors in the same way that knowing the frequency of repair records of automobiles can be useful to someone buying an automobile—such numbers reveal the general risks that jurors/automobile buyers confront.

Experimental Studies Show a Pattern of High Rates of Eyewitness Identification Errors

The research of Haber & Haber (2001) provides further evidence on witness accuracy rates and also supports the conclusion that witnesses who believe that have witnessed actual crimes will perform similarly to witnesses who know they are participating in an experiment. They performed a meta-analysis of experiments in which witness-participants observed a crime or other event and then attempted to identify the perpetrator—across studies Haber & Haber found comparable levels of performance—see the Table below. In 23 studies subject-witnesses watched a video, slide presentation or movie of a crime. In 14 studies, a crime was enacted in the presence of the participants who believed a criminal event was occurring as they watched. However, later—before attempting identifications--the witnesses were told the crime had been staged. In 7 studies, the participants believed they observed a real crime and believed the lineup presentation was real.

	Target Present			Target Absent		
	Hit	Foil ID	Miss	CR	Foil ID	Overall Correct
Demo-Crime/Demo-Lineup	43%	34%	24%	49%	51%	46%
Real-Crime/Demo-Lineup	52%	24%	24%	48%	52%	50%
Real-Crime/Real-Lineup	47%	24%	28%	53%	47%	50%

As shown in the Table, the percentages are very close across the three groups of studies and the small

differences are not significant ($p > 0.05$). Overall, what we learn from these studies is that identifications for persons seen briefly, in non-stressful conditions, and attempted after brief delays, are frequently inaccurate—witnesses in target-present arrays appear to be accurate about half the time and one-third of positive identifications are erroneous identifications of a foil. In target absent arrays, the mistaken identification rate is about 50%.

Field Experiments Testing Witness Memory Show High Rates of Witness Identification Errors

One relevant source of data pertaining to accuracy rates of actual eyewitness identifications emerges from realistic field studies of eyewitness identification. Some researchers (Brigham, Maass, Snyder & Spaulding, 1982; Hosch & Platz, 1988; Krafka & Penrod, 1985; Pigott, Brigham & Bothwell, 1990) have attempted to reap the benefits of both laboratory experiments and realistic crime conditions by conducting well-controlled experiments in a more realistic, field setting. In these studies, data were gathered in these experiments from a total of 291 mock eyewitnesses who were administered 536 separate identification tests. The average correct identification-rate from presentations which included the target person was 41.8%. Thus, nearly 60% of witnesses failed to identify the target when he was present. Unfortunately, the false identification rate of innocent foils was nearly as high as the rate of guilty-target identifications—41%. The false identification rate of foils in target-absent presentations was assessed in two of the studies--the average was 35.8%. In short, identification errors were rampant.

What we learn from these experiments is that identifications for persons seen briefly, in non-stressful conditions, and attempted after brief delays, are frequently inaccurate. Based on the theory that customer-present photoarrays resemble the situation in which the suspect is guilty and customer-absent photoarrays represent the situation in which the suspect is innocent, only 2 out of 5 guilty persons were correctly identified and an innocent person was falsely identified on 1 of 3 target-absent arrays. In one of these studies (Pigott et al., 1990), the mock eyewitnesses were bank tellers, 70% of whom reported that they had received training for eyewitness situations.

Face Recognition is Far from Perfect Even Under Optimal Testing Conditions

What we learn from these experiments is that identifications for persons seen briefly, in non-stressful conditions, and attempted after brief delays, are frequently inaccurate. Based on the theory that customer-present photoarrays resemble the situation in which the suspect is guilty and customer-absent photoarrays represent the situation in which the suspect is innocent, only 2 out of 5 guilty persons were correctly identified and an innocent person was falsely identified on 1 of 3 target-absent arrays. In one of these studies (Pigott et al., 1990), the mock eyewitnesses were bank tellers, 70% of whom reported that they had received training for eyewitness situations.

Immediate Recognition of Faces from Memory. Is person-recognition inherently difficult or might witnesses perform better under optimal circumstances? Megreya and colleagues have conducted studies testing recognition of faces under fairly optimal conditions and found worrisomely poor performance. For example, Megreya & Burton (2006) had participant/witnesses study faces such as the following for as long as the participants needed in order to assure they could recognize the face on a test administered 2 seconds after the target face was removed (participants studied the faces 5 to 10 seconds each and were tested on a 10-person photoarray). The faces were from graduating classes of police officers with the studied-pictures and the photo-array pictures taken the same day. Pictures were shown in high-quality photographs of about 2" x 3" and were very likely all the same race as participants (the study was conducted in Scotland).